(CSE)

COMPUTER SCIENCE AND ENGINEERING
INSTRUCTIONS TO CANDIDATES

1. Candidates should write their Hall Ticket Number only in the space provided at the top left hand corner of this page, on the leaflet attached to this booklet and also in the space provided on the OMR Response Sheet **BESIDES WRITING, THE CANDIDATE SHOULD ENSURE THAT THE APPROPRIATE CIRCLES PROVIDED FOR THE HALL TICKET NUMBERS ARE SHADED USING BALL POINT PEN (BLUE/BLACK) ONLY ON THE OMR RESPONSE SHEET. DO NOT WRITE HALL TICKET NUMBER ANY WHERE ELSE.**

2. Immediately on opening this Question Paper Booklet, check.
   (a) Whether 200 multiple choice questions are printed (50 questions in Mathematics, **25** questions in Physics, **25** questions in Chemistry and **100** questions in Engineering)
   (b) In case of any discrepancy immediately exchange the Question paper Booklet of same code by bringing the error to the notice of invigilator.

3. Use of Calculators, Mathematical Tables and Log books is not permitted.

4. **Candidate must ensure that he/she has received the Correct Question Booklet, corresponding to his/her branch of Engineering.**

5. Candidate should ensure that the booklet Code and the Booklet Serial Number, as it appears on this page is entered at the appropriate place on the OMR Response Sheet by shading the appropriate circles provided therein using Ball Point Pen (Blue/Black) only. Candidate should note that if they fail to enter the Booklet Serial Number and the Booklet Code on the OMR Response Sheet, their Answer Sheet will not be valued.

6. Candidate shall shade one of the circles 1, 2, 3 or 4 corresponding question on the OMR Response Sheet using Ball Point Pen (Blue/Black) only. Candidate should note that their OMR Response Sheet will be invalidated if the circles against the question are shaded using pencil or if more than one circle is shaded against any question.

7. One mark will be awarded for every correct answer. **There are no negative marks.**

8. The OMR Response Sheet will not be valued if the candidate :
   (a) Writes the Hall Ticket Number in any part of the OMR Response Sheet except in the space provided for the purpose.
   (b) Writes any irrelevant matter including religious symbols, words, prayers or any communication whatsoever in any part of the OMR Response Sheet.
   (c) Adopts any other malpractice.

9. Rough work should be done only in the space provided in the Question Paper Booklet.

10. No loose sheets or papers will be allowed in the examination hall.

11. Timings of Test. 10.00 A.M. to 1.00 P.M.

12. Candidate should ensure that he / she enters his / her name and appends signature on the Question paper booklet, leaflet attached to this question paper booklet and also on the OMR Response Sheet in the space provided. Candidate should ensure that the invigilator puts his signature on this question paper booklet, leaflet attached to the question paper booklet and also on the OMR Response Sheet.

13. Before leaving the examination hall candidate should **return both the OMR Response Sheet and the leaflet attached to this question paper booklet** to the invigilator. Failure to return any of the above shall be construed as malpractice in the examination. **Question paper booklet may be retained by the candidate.**

14. This booklet contains a total of **32** pages including Cover page and the pages for Rough Work.

Note: (1) *Answer all questions.*

(2) *Each question carries 1 mark. There are no negative marks.*

(3) *Answer to the questions must be entered only on OMR Response Sheet provided separately by completely shading with **Ball Point Pen (Blue/Black)**, only one of the circles 1. 2. 3 or 4 provided against each question, and which is most appropriate to the question.*

(4) *The OMR Response Sheet will be invalidated if the circle is shaded using pencil or if more than one circle is shaded against each question.*

MATHEMATICS

1. $\int \left(\dfrac{x+2}{x+1} \right) dx =$

(1) $x \log (x+1) + c$

(2) $x \log (x+1) + 2 \log (x+1) + c$

(3) $x + \log (x+1) + c$

(4) $\dfrac{1}{x} \log (x+1) + c$

2. $\int \dfrac{x^2}{\sqrt{1+x^6}} dx =$

(1) $\dfrac{1}{2} \sin^{-1}(x^3) + c$

(2) $2 \cos^{-1}(x^3) + c$

(3) $\dfrac{1}{2} \cosh^{-1}(x^3) + c$

(4) $\dfrac{1}{3} \sinh^{-1}(x^3) + c$

3. $\int 8x^3 e^{2x} dx =$

(1) $(4x^3 - 6x^2 + 6x - 3) e^{2x} + c$

(2) $4x^3 + 6x^2 + 6x + 3e^{2x} + c$

(3) $\left(\dfrac{4x^2}{3} - \dfrac{2}{3}x + \dfrac{1}{3} \right) e^{2x} + c$

(4) $\left(\dfrac{4x^2}{3} + \dfrac{2}{3}x - \dfrac{1}{3} \right) e^{2x} + c$

4. $\lim\limits_{n \to \infty} \left[\dfrac{1}{n} + \dfrac{1}{n+1} + \dfrac{1}{n+2} + ... + \dfrac{1}{3n} \right] =$

(1) $\dfrac{\pi}{3}$

(2) $\dfrac{\pi}{4}$

(3) $\log 2$

(4) $\log 3$

5. $\int_0^{\frac{\pi}{2}} \frac{\sqrt{\sin x}}{\sqrt{\cos x} + \sqrt{\sin x}} dx =$

(1) $\frac{\pi}{2}$ (2) $\frac{\pi}{4}$ (3) 0   (4) 2

6. The area of the region in the first quadrant enclosed by x–axis, y–axis, $y = 3x-2$ and $y = 4$ is

(1) 16   (2) 8   (3) $\frac{16}{3}$ (4) $\frac{8}{3}$

7. The root mean square (RMS) value of $\log x$ over the range $x = 1$ to $x = e$ is

(1) $\frac{\sqrt{(e+1)}}{\sqrt{(e-2)}}$ (2) $\frac{\sqrt{(e-2)}}{\sqrt{(e-1)}}$ (3) $\frac{\sqrt{(e+2)}}{\sqrt{(e+1)}}$ (4) $\frac{\sqrt{(e+2)}}{\sqrt{(e-1)}}$

8. The differential equation formed by eliminating the arbitrary constants a and b in the relation $y = a \cos (nx+b)$ is

(1) $\frac{d^2 y}{dx^2} + n^2 y = 0$ (2) $\frac{d^3 y}{dx^3} - x^3 y = 0$

(3) $\frac{dy}{dx} + ny = 0$ (4) $\frac{d^2 y}{dx^2} - y = 0$

9. The solution of $\frac{dy}{dx} = e^{x-y}$

(1) $e^x - e^{-y} + c = 0$ (2) $e^{x-y} + c$
(3) $e^x + e^y + c = 0$ (4) $e^x - e^y + e^c = 0$

10. The solution of the differential equation $\tan x \frac{dy}{dx} + y = \sec x$ is

(1) $y \sin x - x = c$ (2) $y \cot x + x = c$
(3) $y = \tan x + c$ (4) $y. \csc x = x + c$

11. The solution of the linear third order equation $\dfrac{d^3y}{dx^3} - 7\dfrac{d^2y}{dx^2} + 16\dfrac{dy}{dx} - 12y = 0$ is

   (1) $y = c_1 e^{3x} + c_2 e^x + c_3 e^{4x}$

   (2) $y = c_1 e^{3x} + c_2 xe^x + c_3 e^{4x}$

   (3) $y = c_1 e^{2x} + c_2 xe^{2x} + c_3 e^{4x}$

   (4) $y = c_1 e^{3x} + (c_2 + c_3 x) e^{2x}$

12. If $y_1 = e^x$ and $y_2 = e^{-x}$ are two solutions of the homogeneous differential equation; then

   (1) $y_3 = e^{2x}$ and $y_4 = e^{-2x}$ are also solutions of the equation

   (2) $y_3 = xe^x$ and $y_4 = xe^{-x}$ are also solutions of the equation

   (3) $y_3 = \cosh x$ and $y_4 = \sinh x$ are also solutions of the equation

   (4) $y_3 = \cos x$ and $y_4 = \sin x$ are also solutions of the equation

13. The particular integral (P.I) of the equation $(D^2 + D - 6)y = 5e^{2x} + 6$ is

   (1) $xe^{2x} - 1$

   (2) $e^{2x} + 1$

   (3) $5xe^{2x} + 1$

   (4) $e^{2x} - 1$

14. The particular integral of $(D^2 + 16) y = 8 \cos 4x$ is

   (1) $\cos 4x$

   (2) $x \sin 4x$

   (3) $-\dfrac{1}{4} \sin 4x$

   (4) $-\dfrac{1}{4} \cos 4x$

15. If $A = \begin{bmatrix} 2 & 4 & 3 \\ 1 & 0 & 2 \\ -3 & 5 & 1 \end{bmatrix}$ then,

   (1) $A = A^T$

   (2) A is a diagonal matrix

   (3) A is a singular matrix

   (4) A is a nonsingular matrix

16. If $A = \begin{bmatrix} 2 & 5 & 3 \\ 3 & 1 & 2 \\ 1 & 2 & 1 \end{bmatrix}$ then

   (1) The minors of first row elements are respectively $-3, -1, 5$
   (2) The cofactors of second row elements respectively are $1, -1, 1$
   (3) The cofactors of first row elements respectively are $-3, -1, -5$
   (4) The minors of second row elements respectively are $7, 5, -13$

17. If A, B, C are non singular matrices of order 3 then

   (1) $A(BC) \neq (AB)C$
   (2) $(ABC)^T = A^T B^T C^T$
   (3) $(ABC)^{-1} = C^{-1} B^{-1} A^{-1}$
   (4) $(ABC)^{-1} = 1/(ABC)$

18. If $\begin{bmatrix} 3 & 2 \\ 2 & -3 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 4 \\ 7 \end{bmatrix}$, then

   (1) $x = -1, y = 4$
   (2) $x = 2, y = -1$
   (3) $x = 4, y = -1$
   (4) $x = -1, y = 2$

19. If w is the cube root of unity then $\begin{bmatrix} 1 & w & w^2 \\ w & w^2 & 1 \\ w^2 & 1 & w \end{bmatrix} =$

   (1) 0   (2) 1   (3) -1 (4) 2

20. If $\dfrac{x^2 + 13x + 15}{(2x+3)(x+3)^2} = \dfrac{A}{2x+3} + \dfrac{B}{x+3} + \dfrac{C}{(x+3)^2}$ then $C =$

   (1) 10   (2) 5   (3) 3   (4) 1

21. If $\dfrac{2x+1}{(x^2+1)(x-1)} = \dfrac{Ax+B}{x^2+1} + \dfrac{C}{x-1}$ then $A =$

   (1) -1 (2) $\dfrac{2}{3}$ (3) $-\dfrac{3}{2}$ (4) $-\dfrac{2}{3}$

22. Which of the following statement is TRUE
    (A) The period of sin x is π and the period of cosec x is 2π
    (B) The period of cos x is 2π and the period of sec x is 2π
    (C) The period of tan x is 2π and the period of cot x is π
    (D) The period of cosec x is π and the period of sec x is 3π
    (1) A   (2) B   (3) C   (4) D

23. The range of $3\cos\theta - 4\sin\theta$ is
    (1) $[-1, 1]$ (2) $[0, 4]$ (3) $[-5, 5]$ (4) $[-4, 0]$

24. If $A+B=45°$, then $(1+\tan A)(1+\tan B) =$
    (1) 0   (2) 1   (3) $\frac{1}{2}$ (4) 2

25. $\left(\dfrac{\sin 2A}{1-\cos 2A}\right)\left(\dfrac{1-\cos A}{\cos A}\right) =$

    (1) $\tan\dfrac{A}{2}$ (2) $\cos\dfrac{A}{2}$ (3) $\sec\dfrac{A}{2}$ (4) $\operatorname{cosec}\dfrac{A}{2}$

26. The value of $\dfrac{\sin 70° - \cos 40°}{\cos 50° - \sin 20°} =$

    (1) 1   (2) $\dfrac{1}{\sqrt{2}}$ (3) $\dfrac{1}{\sqrt{3}}$ (4) 0

27. $4\sin\dfrac{11\theta}{2}\cos\dfrac{11}{2}\theta\cos 5\theta$ expressed as sum or difference is
    (1) $\sin 15\theta - \sin 6\theta$
    (2) $\sin 16\theta + \sin 6\theta$
    (3) $\sin 11\theta + \sin 8\theta$
    (4) $\sin 11\theta - \sin 8\theta$

28. If $2\cos^2\theta + 11\sin\theta = 7$, the principal value of θ is

    (1) $60°$ (2) $45°$ (3) $30°$ (4) $22\frac{1}{2}°$

7-B

29. Which one of the following equation is FALSE
    (1) $\cos^{-1}(-x) = \pi - \cos^{-1} x$
    (2) $\sin^{-1}(-x) = \pi - \sin^{-1} x$
    (3) If $-1 \le x \le 1$, then $\cos^{-1}x + \sin^{-1}x = \dfrac{\pi}{2}$
    (4) $\sin^{-1}x \ne \dfrac{1}{\sin x}$

30. In any triangle ABC, $\Sigma (b+c) \cos A =$
    (1) $a+b+c$
    (2) $2(a+b+c)$
    (3) $3(a+b+c)$
    (4) 0

31. With the usual notation, in a triangle ABC
    $$s\left[\frac{r_1 - r}{a} + \frac{r_2 - r}{b} + \frac{r_3 - r}{c}\right] =$$
    (1) $2 (r_1 + r_2 + r_3)$
    (2) $3 (r_1 + r_2 + r_3)$
    (3) $r_1 + r_2 + r_3$
    (4) 0

32. The modulus amplitude form of $-\sqrt{3} + i$ is
    (1) $2 \, cis \, \dfrac{5\pi}{6}$
    (2) $2 \, cis \, \dfrac{3\pi}{6}$
    (3) $2 \, cis \, \dfrac{\pi}{3}$
    (4) $2 \, cis \, \dfrac{\pi}{6}$

33. If $x = \cos\theta + i \sin\theta$, then the value of $x^6 + \left(\dfrac{1}{x^6}\right)$
    (1) 0
    (2) $2 \, i \sin 6\theta$
    (3) $2 \cos 6\theta$
    (4) $2(\cos 6\theta + \sin 6\theta)$

34. The most general second degree equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ represents a circle if
    (1) $a+b = 0, h = 0$
    (2) $a-b = 0, h = 0$
    (3) $a-b = 0, h \ne 0$
    (4) $a+b \ne 0, h \ne 0$

35. The equation of the circle whose radius is $\sqrt{(a^2 - b^2)}$ and whose center is $(-a, -b)$ is
    (1) $x^2 + y^2 + 2ax + 2by + 2a^2 = 0$
    (2) $x^2 + y^2 - 2ax + 2(a^2 + b^2) = 0$
    (3) $x^2 + y^2 + 2ax + 2by + 2(a^2 - b^2) = 0$
    (4) $x^2 + y^2 + 2ax + 2bx + 2b^2 = 0$

36. The coordinates of the parabola $y^2 = 18x$ such that the ordinate equals to three times of the abscissa is
    (1) (3, 9)
    (2) (2, 6)
    (3) (1, 3)
    (4) (162, 54)

37. With respect to the ellipse $5x^2+7y^2=11$, the point $(4,-3)$
    (1) Is a focus
    (2) lies with in the ellipse
    (3) lies outside the ellipse
    (4) lies on the ellipse

38. For the Hyperbola $4x^2-9y^2=36$, the coordinates of the foci are

    (1) $\left(\pm\sqrt{13},0\right)$
    (2) $\left(\pm\sqrt{31},0\right)$
    (3) $(\pm 6,0)$
    (4) $(0,\pm 6)$

39. Which of the following statements are FALSE
    (A) The equation of the tangent at the point (x',y') of the circle $x^2+y^2=a^2$ is $xx'+yy'=a^2$
    (B) The eccentricity of a parabola is unity
    (C) The eccentricity of an ellipse is greater than unity
    (D) The eccentricity of a hyperbola is less than unity
    (1) A, B
    (2) A, D
    (3) B, C
    (4) C, D

40. $\displaystyle\lim_{x\to\infty}\frac{3^{x+1}+4}{3^{x+2}+4}=$

    (1) 1
    (2) 0
    (3) $\dfrac{3}{4}$
    (4) $\dfrac{1}{3}$

41. Derivative of $\cos^{-1}\left(\dfrac{1-x^2}{1+x^2}\right)$ with reference to x is

    (1) $\dfrac{2}{1+x^2}$
    (2) $\dfrac{1}{1-x^2}$
    (3) $2x$
    (4) $\sqrt{\left(1+x^2\right)}$

42. If $y=x^{3x}, (x>0)$ then $\dfrac{dy}{dx}=$

    (1) $3.x^{3x-1}$
    (2) $3x^{2x}$
    (3) $3y(1+\log x)$
    (4) $\dfrac{3y}{\log x}$

43. If $x^{\frac{2}{3}} + y^{\frac{2}{3}} = a^{\frac{2}{3}}$ then $\dfrac{dy}{dx} =$

(1) $\left(\dfrac{x}{y}\right)^{\frac{1}{3}}$
(2) $-\left(\dfrac{y}{x}\right)^{\frac{1}{3}}$
(3) $-\left(\dfrac{x}{y}\right)^{\frac{1}{3}}$
(4) $\left(\dfrac{y}{x}\right)^{\frac{1}{3}}$

44. The derivative of log sec x with respect to tan x is
(1) $\sec x . \tan x$
(2) $\cos x . \cot x$
(3) $\cos x . \sin x$
(4) $\sec x . \cot x$

45. The coordinates of the point $P(x, y)$ on the curve of $y = x^2 - 4x + 5$ such that the tangent at P is parallel to $y = 2x + 4$ are
(1) (3, 2)
(2) (1, 2)
(3) (2, 1)
(4) (5, 4)

46. The function $f(x) = x \log^2 x$ has

(1) Maximum value occurs when $x = \dfrac{1}{e}$
(2) Maximum value occurs when $x = e$

(3) Maximum value occurs when $x = e^{-2}$
(4) Maximum value occurs when $x = e^2$

47. In a cube the percentage increase in side is 2 units. The percentage increases in the volume of the cube is
(1) 3
(2) 6
(3) 8
(4) 16

48. The curves $x = y^2$ and $xy = m$ cut at right angle if
(1) $m = 0$
(2) $m^2 = 8$
(3) $8m^2 = 1$
(4) $m = -1$

49. If $u = e^{ax} \sin by$, then $\dfrac{\partial^2 u}{\partial x^2} + \dfrac{\partial^2 u}{\partial y^2} =$

(1) $(a^2 - b^2) u$
(2) $a^2 + b^2$
(3) $(a^2 + b^2) u$
(4) $(a + b) u$

50. $\displaystyle\int \dfrac{\cos \sqrt{x}}{\sqrt{x}} dx =$

(1) $\sqrt{x} \sin \sqrt{x} + c$
(2) $2 \sin \sqrt{x} + c$
(3) $\sqrt{\cos x} + c$
(4) $\dfrac{\sin \sqrt{x}}{\sqrt{x}} + c$

PHYSICS

51. In thermodynamics, $dQ = 0$ and $dU = -dW$ is true for
    (1) Isothermal process   (2) Adiabatic process
    (3) Isochoric process   (4) Isobaric process

52. A sample of an ideal gas has volume V, pressure P and temperature T. The mass of each ble 'e of the gas is m. The density of the gas is _____
    (1) P/kVT   (2) mkT   (3) mP/kT   (4) P/kT

53. A gas does 4.5 J of external work during adiabatic expansion. Its temperature falls by K. I internal energy will be _____
    (1) increase by 4.5 J   (2) increase by 9.0 J
    (3) decrease by 4.5 J   (4) decrease by 2.25 J

54. One mole of an ideal gas ($\gamma = 5/3$) is mixed with one mole of diatomic gas ($\gamma = 7/5$). The v: e of γ of the mixture
    (1) 3/2   (2) 4/3   (3) 23/15   (4) 35/23

55. In a given process on an ideal gas, $dW = 0$ and $dQ < 0$. Then for the gas _____
    (1) the temperature will decrease   (2) the volume will increase
    (3) the pressure will remain constant   (4) the temperature will increase

56. The threshold wavelength for a metal whose work function is W_0 is λ_0. The threshold wavelen h for a metal whose work function is $W_0/2$ _____
    (1) $\lambda_0/4$ (2) $\lambda_0/2$ (3) $4\lambda_0$ (4) $2\lambda_0$

57. The propagation of light through an optical fiber goes by the principle _____
    (1) Refraction   (2) Total internal reflection
    (3) Interference   (4) Diffraction

58. The dimensions of angular momentum are _____
    (1) MLT^{-1} (2) $ML^{-1}T$ (3) ML^0T^{-2} (4) ML^2T^{-1}

59. The SI unit of universal gas constant R is _____
    (1) Newton K^{-1} mol^{-1} (2) Joule K^{-1} mol^{-1}
    (3) Watt K^{-1} mol^{-1} (4) erg K^{-1} mol^{-1}

60. The magnitude of the resultant of $(A+B)$ and $(A-B)$ is _____

   (1) $2A$

   (2) $\sqrt{(A^2 + B^2)}$

   (3) $2B$

   (4) $\sqrt{(A^2 - B^2)}$

61. Given $A.B = 0$ and $A \times C = 0$, the angle between B and C is _____
   (1) 135°   (2) 90°   (3) 180°   (4) 45°

62. A projectile has a maximum range of 200m. The maximum height attained by it is _____
   (1) 75 m   (2) 100 m
   (3) 25 m   (4) 50 m

63. A block of mass M is lying on a horizontal frictionless surface. One end of a rope mass m is ed to the block and a force F is applied at the free end parallel to the surface. The force acting o he block will be _____
   (1) FM/(M-m)   (2) Fm/(M+m)
   (3) FM/(M+m)   (4) F

64. A block of weight 200 N is pulled along a rough horizontal surface at a constant speed by a fo : of 100 N acting at an angle of 30°. The coefficient of friction between the block and the surfa is _____
   (1) 0.58   (2) 0.75   (3) 0.45   (4) 0.65

65. A boy wants to climb down a rope. The rope can withstand a maximum tension equal to two-thirc the weight of the boy. If g is the acceleration due to gravity, the minimum acceleration witl which the boy should climb down the rope is _____
   (1) g/3   (2) 2g/3   (3) 3g/2   (4) g

66. N bullets each of mass m kg are fired with a velocity v m/s, at the rate of n bullets per second, upon a wall. The reaction offered by the wall to the bullets is given by _____
   (1) nNv/m (2) $nNmv$
   (3) Nmv/n (4) nNm/v

67. A machine gun fires a bullet of mass 40 g with a velocity of 1200 m/s. The man holding it can exert a maximum force of 144 N on the gun. The number of bullets he can fire per second is _____
   (1) 4   (2) 1   (3) 3   (4) 8

68. A horizontal force F pulls a 20 kg box at a constant speed along a horizontal floor. If the coefficient of friction between the box and the floor is 0.25. The work done by the force F in moving the box through a distance of 2 m _____

    (1) 49 J   (2) 147 J

    (3) 196 J   (4) 98 J

69. A uniform rod of mass m and length l is made to stand vertically on one end. The potential energy of the rod in this position is _____

    (1) mgl/4   (2) mgl/2   (3) mgl   (4) mgl/3

70. If momentum is increased by 20%, then kinetic energy increases by _____

    (1) 44%   (2) 77%   (3) 55%   (4) 66%

71. A particle is executing linear SHM of amplitude A. When the displacement is half the amplitude the fraction of kinetic energy is _____

    (1) 1/5   (2) 3/4   (3) 1/2   (4) 1/4

72. For a particle executing S.H.M starting from equilibrium position the phase is $\pi/2$ when it has

    (1) maximum displacement   (2) maximum energy

    (3) half the displacement   (4) maximum velocity

73. A particle executes SHM between $x = -A$ and $x = +A$. The time taken for it to go from 0 to A/2 is T_1 and to go from A/2 to A is T_2. Then

    (1) $T_1 = 2T_2$ (2) $T_1 = T_2$

    (3) $T_1 < T_2$ (4) $T_1 > T_2$

74. Two sounds of wavelengths 5 m and 6 m, travelling in a medium produce 10 beats per second. The speed of sound in the medium _____

    (1) 300 m/s   (2) 320 m/s   (3) 350 m/s   (4) 1200 m/s

75. An observer moves towards a stationary source of sound with a velocity one tenth the velocity of sound. The apparent increase in frequency _____.

    (1) 3%   (2) 0.1%   (3) 5%   (4) 10%

CHEMISTRY

76. Glass is corroded by
    (1) Fluorine (dry or wet)
    (2) Sulphuric acid (concentrated)
    (3) Phosphoric acid
    (4) Carbonic acid

77. The most resistant material to alkaline corrosion is
    (1) Cast iron
    (2) Nickel
    (3) Aluminium
    (4) Brass

78. The monomer of polyvinyl chloride is
    (1) Chloro ethene
    (2) Ethylene dichloride
    (3) Ethyl chloride
    (4) Chloroform

79. Polythene is
    (1) An addition polymerization product
    (2) A condensation polymerization product
    (3) Thermosetting
    (4) Polymer of amylopectin

80. Teflon is
    (1) Phenol formaldehyde
    (2) An inorganic polymer
    (3) Poly tetrafluoroethylene
    (4) A monomer

81. Water gas constitutes mainly of
    (1) CO and H_2
    (2) CO and N_2
    (3) CO_2 and H_2
    (4) CH_4 and H_2

82. The lightest particle is
    (1) Positron
    (2) Neutron
    (3) Proton
    (4) α-particle

83. If an electron has spin quantum number of $+1/2$ and magnetic quantum number of -1, it cannot be present in
    (1) d orbital
    (2) f orbital
    (3) p orbital
    (4) s orbital

84. The ion that is iso electronic with CO is
    (1) NO^+ (2) O_2^+ (3) O_2^- (4) N_2^+

85. The hydrogen bond is strongest in
    (1) O-H-- --S   (2) S-H---O   (3) F-H---F   (4) F-H---O

86. The molecule having pyramidal shape
    (1) PCl_3 (2) SO_3 (3) CO_3^{2-} (4) NO_3^-

87. Crystals of a sodium chloride belong to the system
    (1) Orthorhombic   (2) Cubic   (3) Trigonal   (4) Monoclinic

88. The pH of 0.05 M acetic acid is ($K_a = 2 \times 10^{-5}$)
    (1) 2   (2) 11   (3) 10^{-3} (4) 3

89. The volume in ml. of 0.1 M solution of NaOH required to completely neutralize 100 ml of 0.3 M solution of H_3PO_3 is
    (1) 60   (2) 600   (3) 300   (4) 30

90. The P^{ka} values of four carboxylic acids are 4.76, 4.19, 0.23 and 3.41 respectively. The strongest carboxylic acid among them is the one having P^{ka} value of
    (1) 4.19   (2) 3.41   (3) 0.23   (4) 4.76

91. If pH value of a solution is 8, then its pOH value will be
    (1) 7   (2) 1   (3) 6   (4) 10

92. The standard reduction potential for Li^+/Li, Zn^{+2}/Zn; H^+/H_2 and Ag^+/Ag are –3.05, –0.762, 0.000 and +0.80 V respectively. Which is the strongest reducing agent?
    (1) Ag   (2) H_2 (3) Zn   (4) Li

93. The standard reduction potential for the following half-cell reactions are
    $Zn = Zn^{+2} + 2e^-$ $E° = -0.76V$
    $Fe = Fe^{+2} + 2e^-$ $E° = -0.44V$
    The E.M.F. for the cell reaction $Fe^{+2} + Zn \rightarrow Zn^{+2} + Fe$ will be
    (1) –0.32 V   (2) +0.32 V   (3) +1.20 V   (4) –1.20 V

94. In salt bridge, KCl is used because
    (1) KCl is present in calomel electrode
    (2) K^+ and Cl^- ions are not iso electronic
    (3) K^+ and Cl^- ions have the same transport number
    (4) KCl is an electrolyte

95. The metal that cannot be obtained by electrolysis of aqueous solution of its salt is
    (1) Ag   (2) Au   (3) Cu   (4) Al

96. BOD of raw municipal sewage may be about
    (1) 2-5 mg/lit   (2) 5-10 mg/lit
    (3) 150-300 mg/lit   (4) 2000-3000 mg/lit

97. The pH value of potable water should be between
    (1) 1 to 1.5   (2) 6.5 to 8
    (3) 13 to 14   (4) 4 to 5

98. Deaeration of high pressure boiler feed water is done to reduce
    (1) Foaming from boilers   (2) Its dissolved oxygen content
    (3) Its silica content   (4) Caustic embrittlement

99. Presence of non-biodegradable substances like alkyl benzene sulphonate from detergents in polluted water stream causes
    (1) Fire hazards   (2) Explosion hazards
    (3) Persistent foam   (4) Depletion of dissolved oxygen

100. Presence of soluble organics in polluted water causes
    (1) Undesirable plants growth   (2) Depletion of oxygen
    (3) Fire hazards   (4) Explosion hazards

COMPUTER SCIENCE AND ENGINEERING

101. Operator is used to compare a value to a list of literals value that have been specified
   - (1) BETWEEN
   - (2) ANY
   - (3) IN
   - (4) ALL

102. In E-R Diagram relationship type is represented by
   - (1) Ellipse
   - (2) Dashed ellipse
   - (3) Rectangle
   - (4) Diamond

103. A relation in which the intersection of each row and column contains one and only one value is said to be in
   - (1) First normal form
   - (2) Second normal form
   - (3) Third normal form
   - (4) Fourth normal form

104. Two phase protocol in a database management is
   - (1) A concurrency mechanism that is not deadlock free
   - (2) A recovery protocol used for restoring a database after a crash
   - (3) Any update to the system log done in two phases
   - (4) Not effective in database

105. Which of the following is not a type of constructor?
   - (1) Copy constructor
   - (2) Friend constructor
   - (3) Default constructor
   - (4) Parameterized constructor

106. Which of the following concepts says, method invoking at runtime?
   - (1) Data hiding
   - (2) Dynamic Typing
   - (3) Dynamic binding
   - (4) Dynamic loading

107. Which one of the following are standard stream objects
   - (1) PIPE
   - (2) SYS
   - (3) ERROR
   - (4) BUFF

(CSE)

108. How many objects can be created from an abstract class?

    (1) Zero   (2) One
    (3) Two   (4) As many as we want

109. Which of the following will be called when an object goes out of scope?

    (1) Constructor   (2) Destructor
    (3) Main   (4) Virtual function

110. Which of the following function/ type of function cannot be overloaded?

    (1) Member function   (2) Static function
    (3) Virtual function   (4) Operator function

111. Which of the following statement is correct?

    (1) Two functions having same number of argument, order and type of argument can be overloaded if both functions do not have any default argument.
    (2) Overloaded function must have default arguments.
    (3) Overloaded function must have default arguments starting from the left of argument list
    (4) A function can be overloaded more than once

112. The operator that cannot be overloaded is :

    (1) + +   (2) ( )   (3) : :   (4) ~

113. If you create a file by 'fstream', then the default mode of the file is :

    (1) ios :: app   (2) ios :: out
    (3) ios :: app & ios :: out   (4) ios :: in & ios :: out

114. When you derive a class privately, a protected base class member becomes

    (1) Private   (2) Public   (3) Not inherited   (4) Protected

115. Which will legally declare, construct, and initialize an array?

    (1) int [] my List = {"1", "2", "3"};   (2) int [] myList = (5, 8, 2);
    (3) int myList [] [] = {4, 9, 7, 0};   (4) int myList [] = {4, 3, 7};

116. Which two are valid constructors for thread in JAVA?
   a)   Thread (Runnable r, string name)
   b)   Thread ( )
   c)   Thread (int priority)
   d)   Thread (Runnable r, Thread Group g)
   (1)   (a) & (c)   (2)   (b) & (d)
   (3)   (a) & (b)   (4)   (c) & (d)

117. Which is TRUE about a method - local inner class
   (1)   it must be marked final   (2)   it can be marked abstract
   (3)   it can be marked public   (4)   it can be marked static

118. What will be the output of the program?
   ```
   try
   {
   int x= 0;
   int y = 5 / x ;
   }
   catch (Exception e)
   {
       System. out. println ("Exception");
   }
   catch (Arithmetic Exception ae)
   {
       System.out. println ("Arithmetic Exception");
   }
   System.out.println ("finished');
   ```
   (1)   Finished   (2)   Exception
   (3)   Compilation fails   (4)   Arithmetic Exception

119. Given a class name as 'Student', which of the following is a valid constructor declaration for the class?
   (1)   Student (student s) { }   (2)   Student student ( ) { }
   (3)   Private final student ( ) {}   (4)   Void student ( ) {}

120. Which of the keyword is used to define packages in Java?

    (1) pkg   (2) Pkg   (3) package   (4) Package

121. Which of the access specifier can be used as an interface?

    (1) Public   (2) Protected   (3) Private   (4) Default

122. What is multithreaded programming?

    (1) It's a process in which two different processes run simultaneously.

    (2) It's a process in which two or more parts of same process run simultaneously.

    (3) It's a process in which many different processes are able to access same information.

    (4) It's a process in which a single process can access information from many sources.

123. Which of these keywords is not part of exception handling?

    (1) try   (2) finally   (3) thrown   (4) catch

124. Which of these methods can be used to output a string in an applet?

    (1) display ()   (2) print ()

    (3) drawstring ()   (4) transient ()

125. Html document must always be saved with :

    (1) .html   (2) .txt   (3) .doc   (4) .pdf

126. To insert blank lines, which tags are used :

    (1) <p>   (2) <bk>   (3)
       (4) <ba>

127. HTML stands for;

    (1) Hyper text marker language   (2) Hyper tab marker language

    (3) High transfer markup language   (4) Hyper text markup language

128. The schedular which determines when processes are to be suspended and resumed.

    (1) Short-term schedular   (2) Long-term schedular

    (3) Medium-term schedular   (4) Job schedular

(CSE)

129. Which of the following is not a disk scheduling algorithm.
    (1) SSTF   (2) C - SCAN   (3) SRTF   (4) LOOK

130. In VB Script functions, which one is false among the following
    (1) Variables must be declared before use
    (2) Variables may not be declared before use
    (3) Variables may be declared without data types
    (4) Variables are used in VB script

131. A running program requests the service from the kernel of the operating system using a _____.
    (1) System call   (2) Function call
    (3) Procedure call   (4) Remote call

132. The leading bits of an IP address of a class B network are _____
    (1) 10   (2) 01   (3) 110   (4) 0

133. _____ tab enables you to view the current value of any variable or VB Script expression.
    (1) Watch   (2) View
    (3) Locate   (4) Current

134. What does ASP stands for ?
    (1) All Standard Pages   (2) Active Server Pages
    (3) Active Standard Pages   (4) A Server Page

135. Convert the fractional decimal number 6.75 to binary.
    (1) 0111.1100   (2) 0110.1010
    (3) 0110.1100   (4) 0110.0110

136. If a 3-input AND gate has eight input possibilities, how many of those possibilities will result in a HIGH output?
    (1) 1   (2) 2   (3) 7   (4) 8

137. One advantage TTL has over CMOS is that TTL is _____ .
    (1) Less expensive
    (2) Not sensitive to electrostatic discharge
    (3) Faster
    (4) More widely available

138. Applying DeMorgan's theorem to the expression $\overline{\overline{ABC}}$ we get _____ .
    (1) $\overline{A} + \overline{B} + \overline{C}$
    (2) $\overline{A+B+C}$
    (3) $A + \overline{B} + C\overline{C}$
    (4) $A(B+C)$

139. Which statement below best describes a Karnaugh map?
    (1) A Karnaugh map can be used to replace Boolean rules
    (2) The Karnaugh map eliminates the need for using NAND and NOR gates
    (3) Variable complements can be eliminated by using Karnaugh maps
    (4) Karnaugh maps provide a cookbook approach to simplifying Boolean expressions

140. How is a J-K flip-flop made to toggle?
    (1) J = 0, K = 0
    (2) J = 1, K = 0
    (3) J = 0, K = 1
    (4) J = 1, K = 1

141. How many flip-flops are required to make a MOD-32 binary counter?
    (1) 3
    (2) 32
    (3) 5
    (4) 6

142. Which gate is best used as a basic comparator?
    (1) NOR
    (2) OR
    (3) Exclusive-OR
    (4) AND

143. Which segment register of 8086 is used for addressing a memory location in the code segment of the memory, where the executable program is stored.
    (1) Code segment register
    (2) Data segment register
    (3) Extra segment register
    (4) Stack segment register

144. The 8086 _____ register contents indicate the results of computation in the ALU.
    (1) Data Segment
    (2) Flag
    (3) Index
    (4) Accumulator

(CSE)

145. In 8086 _____ along with _____ forms a pipeline.
    (1) Bus Interface Unit, Arithmetic and Logic unit
    (2) Execution Unit, Arithmetic and Logic unit
    (3) Bus Interface Unit, Memory unit
    (4) Bus Interface Unit, Execution unit

146. If this flag is set, the maskable interrupts are recognized by the CPU, otherwise they are ignored. What is that flag in 8086?
    (1) Trap   (2) Interrupt
    (3) Directional   (4) Overflow

147. For the following instruction, what is the effective address :
    MOV AX, [BX] [SI]
    (1) 10H*DS+[SI]   (2) 10H*DS+[BX]*[SI]
    (3) 10H*DS+[BX]+[SI]   (4) 10H*[BX]+[SI]

148. Which instruction of 8086, is used for finding out the codes in case of code conversion problems, using look up table techniques?
    (1) TEST   (2) DAS
    (3) CBW   (4) XLAT

149. The conditional branch instruction used to transfer execution to the address 'label', if ZF = 1 or neither SF nor OF is 1, is _____
    (1) JNL/JGE label   (2) JLE/JNC label
    (3) JL/JNGE label   (4) JNLE/JE label

150. The 80286 CPU is able to address _____ MB of physical memory.
    (1) 16   (2) 24   (3) 32   (4) 8

151. The size of the address bus of 80386 is _____ bit.
    (1) 16   (2) 24   (3) 32   (4) 64

152. The 80486 is packaged in a _____ grid array package.
   (1) 32-pin
   (2) 48-pin
   (3) 64-pin
   (4) 168-pin

153. Which of the following is a sequential access device
   (1) Hard disk
   (2) Optical disk
   (3) Tape
   (4) Flash memory

154. The addressing mode in which the operand is given explicitly in the instruction it self is
   (1) Absolute mode
   (2) Index mode
   (3) Register Direct mode
   (4) Immediate mode

155. Which of the following interrupt is non maskable
   (1) INTR
   (2) RST 7.5
   (3) RST 6.5
   (4) TRAP

156. Speed of microprocessor depends on
   (1) Data Bus width
   (2) Access Time
   (3) Response Time
   (4) Hard disk

157. Zero address instruction format is used for
   (1) RISC architecture
   (2) CISC architecture
   (3) Von-Neuman architecture
   (4) Stack-organized architecture

158. The two types of main memory are
   (1) Primary and secondary
   (2) Random and sequential
   (3) ROM and RAM
   (4) Central and peripheral

159. How many address lines are needed to address each memory locations in a 2048 X 4 memory chip?
   (1) 10
   (2) 11
   (3) 8
   (4) 12

(CSE)

160. CISC stands for
    (1) Co-related Instruction Set Computer
    (2) Combined Instruction Set Computer
    (3) Complex Instruction Set Computer
    (4) Common Instruction Set Computer

161. Fastest type of memory from the following list is
    (1) Tape
    (2) Semiconductor
    (3) Disk
    (4) Bubble memory

162. The entity that is not involved in a memory write operation.
    (1) MAR
    (2) Data Bus
    (3) PC
    (4) MDR

163. What is the output of this C code
    ```
    # include <stdio. h>
    void main ( )
    {
    int a = –5;
    int k = (a++, ++a);
    printf("%d\n", k);
    }
    ```
    (1) –3
    (2) –5
    (3) 4
    (4) Undefined

164. What is the output of this C code
    ```
    #include < stdio.h>
    int main ( )
    {
    int x = 2;
    x = x << 1;
    print f("% d\n",x);
    }
    ```
    (1) 4
    (2) 1
    (3) Depends on the compiler
    (4) Depends on the endianness of the machine

(CSE)

165. What is the output of this 'C' code ?
```
#include <stdio.h>
void main ( )
{
int x = 4, y, z;
y = --x;
z = x--;
printf("% d% d% d", x, y, z);
}
```
(1) 3 2 3   (2) 2 3 3   (3) 3 2 2   (4) 2 3 4

166. Number of internal nodes in a full binary tree of height k is
(1) 2^{k-1} (2) $2^k - 1$ (3) 2^k (4) $2^k + 1$

167. What is the output of this 'C' code?
```
#include <stdio.h>
void main ( )
{
char *s = "hello";
char *p = s;
printf("%c\t %c", *(p + 3), s[1]);
}
```
(1) h e   (2) l l   (3) l 0   (4) l e

168. What is the correct syntax to declare a function foo() which receives an array of strucuture in a function?
(1) void foo (struct *var);   (2) void foo (struct *var[]);
(3) void foo(struct var);   (4) None of the mentioned

169. The data structure which is called as one ended.
(1) queue   (2) stack   (3) tree   (4) graph

170. A linear list in which each node has pointers to point to the predecessor and successors nodes is called as _____
(1) Singly Linked List   (2) Circular Linked List
(3) Doubly Linked List   (4) Linear Linked List

171. Preorder is same as
    (1) Depth-first order
    (2) Breadth-first order
    (3) Topological order
    (4) Linear order

172. The complexity of merge sort algorithm is
    (1) O(n)
    (2) O(log n)
    (3) O(n2)
    (4) O(n log n)

173. Which layer of the OSI Reference model offers format and code conversion services
    (1) Physical layer
    (2) Network layer
    (3) Session layer
    (4) Presentation layer

174. The most common UTP connector is
    (1) BNC
    (2) RJ-45
    (3) SC
    (4) MT-RJ

175. To which class of IP addresses the following address corresponds to
    11000001 10000011 00011011 11111111
    (1) Class A
    (2) Class B
    (3) Class C
    (4) Class D

176. A block of IP addresses is granted to a small organization. We know that one of the addresses is 205.16.37.39/28. What are the first and last addresses in the block?
    (1) 205.16.37.39 and 205.16.37.47
    (2) 205.16.37.32 and 205.16.37.47
    (3) 205.16.37.32 and 205.16.37.39
    (4) 205.16.37.32 and 255.16.37.47

177. IEEE 802.3 standard defines _____ as the access method for first generation 10-Mbps Ethernet.
    (1) CSMA/CA
    (2) Non Persistent CSMA/CD
    (3) 1-Persistent CSMA/CD
    (4) p-Persistent CSMA/CD

178. The protocol that automates the IP configuration including IP address, Subnet mask, default gateway and DNS information is
    (1) SNMP
    (2) DHCP
    (3) SMTP
    (4) ARP

179. _____ uses commands and responses of transfer message between an MTA client and an MTA server.

(1) POP3   (2) SMTP   (3) HTTP   (4) FTP

180. In HTTP v1.1, which request type is used to echo the incoming request

(1) GET   (2) POST   (3) PUT   (4) TRACE

181. _____ is the client/ server application that allows a user to log on to a remote machine, giving the user access to the remote system.

(1) HTTP   (2) SNMP
(3) TELNET   (4) MIME

182. Which LAN topology is easy to install but difficult in reconnection and fault isolation.

(1) STAR   (2) BUS
(3) RING   (4) MESH

183. Which one of the following is not a Real time operating system?

(1) VxWorks   (2) Windows CE
(3) RTLinux   (4) Palm OS

184. To access the services of operating system, the interface is provided by the

(1) System calls   (2) API
(3) Library   (4) Assembly instructions

185. What is a long-term scheduler?

(1) It selects which process has to be brought into the ready queue
(2) It selects which process has to be executed next and allocates CPU
(3) It selects which process to remove from memory by swapping
(4) It selects which process has to be brought into the Blocked process

186. Time quantum is defined in

(1) Shortest job scheduling algorithm   (2) Round robin scheduling algorithm
(3) Priority scheduling algorithm   (4) Multilevel queue scheduling algorithm

       (CSE)

187. The strategy of making processes that are logically runnable to be temporarily suspended is called :
    (1) Non preemptive scheduling
    (2) Preemptive scheduling
    (3) Shortest job first
    (4) First come first served

188. The most optimal scheduling algorithm is :
    (1) FCFS - First come First served
    (2) SJF - Shortest Job First
    (3) RR - Round Robin
    (4) LCFS - Last Come First Serve

189. Consider the following set of processes, the length of the CPU burst time given in milliseconds :

Process	Burst time
P1	6
P2	8
P3	7
P4	3

Assuming the above process being scheduled with the SJF scheduling algorithm :
    (1) The waiting time for process P1 is 3ms.
    (2) The waiting time for process P1 is 0ms.
    (3) The waiting time for process P1 is 16ms.
    (4) The waiting time for process P1 is 9ms.

190. Whic one of the following is the deadlock avoidance algorithm?
    (1) Banker's algorithm
    (2) Round-robin algorithm
    (3) Elevator algorithm
    (4) Karn's algorithm

191. In fixed sized partition. the degree of multiprogramming is bounded by _____ .
    (1) The number of partitions
    (2) The CPU utilization
    (3) The memory size
    (4) BOIS

192. A process refers to 5 pages, A,B,C,D,E, in the order : A, B, C, D, A,B, E, A, B, C, D, E. If the page replacement algorithm is FIFO, the number of page transfers with an empty internal store of 3 frames is :
    (1) 8
    (2) 10
    (3) 9
    (4) 7

(CSE)

193. Consider a disk queue with requests for I/O blocks on cylinders :

98, 183, 37, 122, 14, 124, 65, 67

Considering FCFS (first cum first served) scheduling, the total number of head movements is, if the disk head is initially at 53 :

(1) 600   (2) 620   (3) 630   (4) 640

194. On systems where there are multiple operating system. the decision to load a particular one is done by :

(1) Boot loader   (2) Boot strap

(3) Process control block   (4) File control block

195. Which of the following Command is used to give Permission of operation to other users in Database.

(1) Permission   (2) Allow   (3) Grant   (4) Revoke

196. All of the following are types of databases, except :

(1) Relational   (2) Relational oriented

(3) Object oriented   (4) Multidimensional

197. Which of the following is not a DML statement?

(1) UPDATE   (2) COMMIT   (3) INSERT   (4) DELETE

198. In the architecture of a database system, external level is the

(1) Physical level   (2) Logical level

(3) Conceptual level   (4) View level

199. The column of a table is referred to as the

(1) Tuple   (2) Attribute

(3) Entity   (4) Degree

200. A primary key for an entity is

(1) A candidate key   (2) Any attribute

(3) A unique attribute   (4) A super key